

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-3 (cancelled)

4. (new) A method of generating a hybrid grid applicable to a heterogeneous formation crossed by at least one pipe or at least well of known geometry, in order to form a model representative of fluid flows in the formation in accordance with a defined numerical pattern, structure of the formation being known a priori from available data acquired through in-situ measurements, analyses and/or interpretations of images of the formations, comprising:

generating a first structured grid to grid the formation by consideration of discontinuities thereof;

generating at least one second structured radial type grid to grid the zones around the at least one well or the at least one pipe, the second grid allowing consideration of constraints linked with flows in the at least one well or the at least one pipe;

associating the first and second structured grids;

forming at least one unstructured transition grid by applying using a generalized map processing; and

generating a hybrid grid by inserting the unstructured transition grid between the first structured grid and each second structured grid.

5. (new) A method as claimed in claim 4, wherein:

the second structured grid is imported in a cavity, a size of the cavity allowing formation of a unstructured transition grid between the first structured grid associated with the formation and the second structured grid associated with each well or pipe, the unstructured transition grid being formed by consideration of constraints linked with the numeral pattern and the first grid being metrically structured, globally or by faulted blocks.

6. (new) A method for simulating, in accordance with a defined numerical pattern, evolution of a process in a heterogeneous medium crossed by at least one pipe or at least one well of known geometry, structure of a formation in the medium being known a priori from available data acquired through in-situ measurements, analysis and/or interpretations of images, of the formation comprising;

generating a first structured grid to grid the formation by consideration of discontinuities thereof;

generating at least one second structured radial type grid to grid zones around the at least one well or the at least one pipe, the at least one second structured radial type grid allowing consideration of constraints linked with flows in that at least one well or the at least one pipe;

associating the first and second structured grids;

forming at least one unstructured transition grid by applying a generalized map process;

generating a hybrid grid by inserting the at least one unstructured transition grid between the first structured grid and each second structured grid; and

solving the numerical pattern in the hybrid grid formed for the formation.

7. (new) A method in accordance with claim 6 wherein:
the evolution of the process involves fluid flows.